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SUGGESTED SOLUTION

FINAL MAY 2019 EXAM

SUBJECT- SCM & PE

Test Code - FNJ 7082

BRANCH - () (Date :)

Head Office : Shraddha, 3rd Floor, Near Chinai College, Andheri (E), Mumbai – 69.

Tel : (022) 26836666

Answer 1:

(i) The cumulative average time *per batch* for the first 25 batches

The usual learning curve model is

$$y = ax^b$$

Where

y = Average time per batch (hours) for x batches
a = Time required for first batch (hours)
x = Cumulative number of batches produced
b = Learning coefficient

The Cumulative Average Time *per batch* for the first 25 batches

$$y = 1{,}000 \times (25)^{-0.322}$$

$$\log y = \log 1{,}000 - 0.322 \times \log 25$$

$$\log y = \log 1{,}000 - 0.322 \times \log (5 \times 5)$$

$$\log y = \log 1{,}000 - 0.322 \times [2 \times \log 5]$$

$$\log y = 3 - 0.322 \times [2 \times 0.69897]$$

$$\log y = 2.549863$$

$$y = \text{antilog of } 2.549863$$

$$y = 354.70 \text{ hours}$$ **(4 marks)**

(ii) The time taken for the 25th batch

Total Time for first 25 batches = 354.70 hours × 25 batches

= 8,867.50 hours

Total Time for first 24 batches = 359.40 hours × 24 batches

= 8,625.60 hours

Time taken for 25th batch = 8,867.50 hours – 8,625.60 hours

= 241.90 hours **(2 marks)**

(iii) Average 'Selling Price' of the final 500 units

Particulars	**Amount (`)**
Direct Labour [(8,867.50 hrs. + 241.90 hrs. × 25 batches) × ` 6]	89,490
Add: Other Variable Costs (5,000 units × ` 19)	95,000
Add: Fixed Costs	40,000
Total Life Cycle Cost	2,24,490
Add: Desired Profit	80,000
Expected Sales Value (5,000 units × ` 19)	3,04,490
Less: Sales Value (4,500 units × ` 64)	2,88,000
Sales Value (Decline Stage) ...(A)	16,490
Sales Units (Decline Stage) ...(B)	500

Average Sales Price *per unit*	…(A)/(B)	32.98

(4 marks)

Answer 2:

HAL's Control System HAL's current control system is 'focused exclusively' on the manufacturing process and its efficiency even though HAL is also a retailer and installer of industrial ACs. It is suitable for HAL's control system to monitor manufacturing efficiency with the help of the three variances: material usage, material price and manufacturing labour efficiency. No reasons have been given for focusing on these three variances and there may be other variances which can provide useful control information that are not currently computed for example, labour rate and material yield. Although HAL uses standard costing, it is unclear whether it calculates product costs. A lack of product costs computation may be the reason that it was shocked about its 2017 profit margin. Standard costing could be in criticism for misdirecting management's attention. Thus, in the case of a 'Summer – Cool' AC where the highest standards of materials are used, it is pertinent that the quality of the finished product is not compromised. Therefore, it might be proper to accept an unfavourable material price variance to maintain the product's standards. Variance analysis should not be done in isolation but a holistic view needs to be taken about HAL's operations and the current control system may not lead to this. HAL is not currently controlling and monitoring aspects which are important for competitive success. HAL's Critical Success Factors have not been identified yet. There is monthly reporting of variances but in addition to this, there should also be follow – up actions for outcome resulting from these reports. However, a month is not inevitably the relevant reporting period for all aspects of HAL's business. If there is a production problem leading to excessive materials wastages, a month is too long time to wait before remedial action are taken. Therefore, real time or coexistent reporting may be more relevant for manufacturing operations. A major deficiency of HAL's control systems is that they do not extend to retailing and installation activities. The 'Summer' installation teams are incentivized to complete ACs which could be good for their productivity. However, there is a high level of complaints associated with their work. As there is no evident means of monitoring the installation team's work, the reasons of the complaints cannot be identified.

(ii) **Critical Success Factors (CSF)** are elements tied to the strategy of business and they represent objectives that business is trying to achieve, as a corporation, as a department or as a business unit. Critical success factors may vary over time and may include items like employee attitudes, manufacturing flexibility etc. There are a range of CSF's which could be appropriate for HAL. They include :

CSF : Installations Quality There are different quality expectations for the two ACs and there have been different levels of quality achieved, can be seen in the historic pattern of complaints. This strongly implies that the quality of installation should be tracked as a separate CSF for each AC. This CSF is important for HAL due to cost implications of rectifications and guarantee claims. It is also important to consider that because of the effect that poor quality will have on HAL's future business.

CSF : Customer Satisfaction Like quality, this CSF will need to be monitored separately for each AC. Customer satisfaction encompass the complete life of a transaction beginning with the initial enquiry about a purchase and continuing after installation for the life of the AC.

Customer satisfaction will have an influence on HAL's future business which is dependent, in part, on repeat orders and recommendations. This CSF will also show the market's view of HAL's brand.

CSF: Brand Performance HAL has two distinct brands. They are directed at different market segments and have different associated attributes. 'Summer' ACs offer limited choice to the customer and retail, on average, for Rs. 36,000. HAL would like to maintain this business at its present level (7,000 ACs a year minimum) Rs. 252 million revenue. HAL needs to ascertain where this brand is situated in its life – cycle and what marketing activities may be required to support it. The 'Summer – Cool' brand is aimed at a different market segment and HAL would like to grow this aspect of its business which produces revenue of Rs. 504 million. The success of both brands is important for the continual success of HAL and this CSF indicate a complete view of performance.

CSF : Manufacturing Excellence HAL manufactures all the ACs which it sells and installs. Manufacturing must be a substantial part of HAL's total costs and a significant contributor to profitability. Currently, HAL monitors some limited aspects of manufacturing through its control system. However, there are many other aspects which have not been reported upon, for example – innovation, labour abseentism, manufacturing flexibility and investment in technology. This CSF is much broader than the current control system. It also assists in searching for competitiveness.

(iv) **Standard Costing and Reporting System** HAL may be required to abandon or modity its standard costing and reporting system. The rationale behind this is that the current control system might lead to an inappropriate emphasis being placed on certain aspects of performance. It is noteworthy that the installations for 'Summer' AC is causing a substantial level of complaints whereas there has never been a complaint made about a 'Summer Cool' AC. It could be that the different remuneration arrangements for the ACs' installation teams have led to this and as the complaint level is an important aspect of the CSF i.e. Customer Satisfaction, HAL may need to modify its remuneration arrangements. It should also reckon whether it would be benefited from a broader range of variance reporting, for example, it may find reporting useful to report on labour rates and material yield. For all CSFs, HAL will need to determine the appropriate reporting intervals. Although it is useful to synchronize this with the accounting reporting cycle, CSFs and KPIs do not necessarily coexist with accounting period ends. Some KPI's may require to be reported in real – time, for example, material wastage, others may be of a longer duration like Customer Satisfaction. There is a strong argument for disassociation of the CSFs reporting from the financial reporting cycles. **(20 marks)**

Answer 3:

Reconciliation of Operating Income

Particulars	Amount ( )
Operating Income in 2016	10,80,000
Add: Change Due to Industry Market Size Factor (W.N.-1)	84,000
Changes Due to Productivity (W.N.-2)	58,000
Changes Due to Product Differentiation (W.N.-3)	2,20,000
Operating Income in 2017	14,42,000

(3 marks)

Workings:

Total Increase in Sale of Cardboard Boxes 20,000 Boxes (4,20,000 Boxes – 4,00,000 Boxes). Out of this increase in Sales of 20,000 Boxes,12,000 Boxes (3% of 4,00,000) is due to growth in market size, and the remaining 8,000 Boxes (20,000 Boxes – 12,000 Boxes) are due to an increase in market share .

W.N.1 Effect of the Industry Market Size Factor on operating income:

= Revenue and Cost Effect of Growth Component in 2017 × $\frac{\text{Increase in Sales Unit Due to Market Growth}}{\text{Total Growth in Sales Unit (from 2016 to 2017)}}$

= $₹1,40,000 \times \frac{12,000 \text{Boxes}}{20,000 \text{Boxes}}$

= ₹84,000 (F)

W.N.2 Effect of Productivity on operating income:

= Cost Effect of Productivity Component in 2017

= ₹58,000 (F)

W.N.3 Effect of Product Differentiation on operating income:

Particulars	Amount ( )
Increase in the Selling Price (Revenue Effect of the Price Recovery Component)	4,20,000 (F)
Increase in Prices of Inputs (Cost Effect of the Price Recovery Component)	2,56,000 (A)
Growth in Market Share Due to Product Differentiation* Rs.140000 x (8000 boxes / 20000 boxes)	56,000 (F)
Total	2,20,000 (F)

* Revenue and Cost Effect of Growth Component in 2017 × $\frac{\text{Increase in Sales Unit Due to Product Differentiation}}{\text{Total Growth in Sales Unit (from 2016 to 2017)}}$

(3 marks)

Answer 4:

Customer Wise profitability Statement and Overall Profitability Statement

SN.	Particulars	PER	MGH	WLY	Total Rs.
A	Sales (net proceeds) – Table 1	241,288	237,500	272,812	751,600
B	Variable Cost of Goods sold	1,50,000	1,42,500	1,87,500	4,80,000
C	Assignable – Marketing and Administration Cost – Table 2				
	• Order Taking and Processing	1,200	600	4,500	6,300
	• Sale Return Processing	150	-	1,200	1,350
	• Billing Cost	200	100	750	1,050
	• Customer Visit	800	-	4,000	4,800
	Total Assignable Marketing and Administration Cost	2,350	700	10,450	13,500
D	Assignable – Distribution Cost – Table 2				

	Expedited / Rush Orders	250	-	1,250	1,500
	Delivery Costs	8,000	4,000	-	12,000
	Inventory Carrying Cost	10,000	9,500	12,500	32,000
	Total Assignable Distribution Cost	18,250	13,500	13,750	45,500
E	Non – Assignable Fixed Cost	-	-	-	1,00,000
F	Total Costs (B + C + D + E)	170,600	156,700	211,700	639,000
G	Net Profit (Step A – F)	70,688	80,800	61,112	112,600
H	Profit % of Sales (G/A)	29%	34%	22%	15%

(4 marks)

Workings

Table : 1 Customer sales Analysis – Revenue Analysis

All figures in Rs.

Particulars	PER	MGH	WLY	Total Rs.
Sales (Sales Units × Sale Price (gross))	2,50,000	2,37,500	3,12,500	8,00,000
Less : Sales Return (Step 1 × Return %)	1,250	-	31,250	32,500
Net Sales	2,48,750	2,37,500	2,81,250	7,67,500
Less : Cash Discount	7,462	-	8,438	15,900
Net Proceeds	2,41,288	2,37,500	2,72,812	7,51,600

(1 marks)

Table : 2 Assignable Marketing, Administrative and Distribution Costs

All figure in Rs.

Particulars	PER	MGH	WLY	Total
Order Taking and Processing (# of orders × cost per order)	1,200	600	4,500	6,300
Expedited / Rush Orders (# of orders × cost per order)	250	-	1,250	1,500
Delivery Costs (Distance in km. × cost per km)	8,000	4,000	-	12,000
Sales Return Processing (# of returns × cost per return)	150	-	1,200	1,350
Billing Cost (# of invoices × cost per invoice)	200	100	750	1,050
Customer Visit (# of customer visits × cost per visit)	800	-	4,000	4,800
Inventory Carrying Cost (# of units × inventory carrying cost p.u.)	10,000	9,500	12,500	32,000

(3 marks)

Answer 5:

Traditional vs. Strategic Cost Management

	Traditional Cost Management	Strategic Cost Management
Time Span	Short term concept	Long term concept
Focus	Internal	Both internal and external
Cost Driver Concept	Based on volume of the product.	Each value activity has a separate cost driver. So, not based on volume but on activities associated with the manufacturing of the product.
Objective	Score keeping, attention directing and problem solving.	Cost leadership or product differentiation.
Cost Reduction	Primary objective is cost reduction.	Primary objective is cost containment – cost reduction and value improvement at the same time.
Approach	Risk – averse.	Risk taking and ability to adapt itself with changing environment.

(6 marks)